CLAIMS

Having thus described the preferred embodiments, the invention is now claimed to be:

1. A system for calibrating a solid state detector **(20)** for a radiation imaging device **(10)** in a single acquisition, the system comprising:

a means **(40)** for emitting radiation concurrently at least first and second preselected energy levels;

a means **(16)** for generating associated sets of radiation data spanning both the first and second energy levels from the emitted radiation that is received by solid state detector **(20)**;

a means **(64)** for determining associated centers of energy peaks and energy values of the generated data sets; and

a means **(80)** for calibrating at least one of gain, offset, performance and dead pixel correction based on the determined centers and peaks of the acquired data sets.

2. The system as set forth in claim 1, wherein the radiation emitting means **(40)** includes:

a tank **(42)**, which holds a radioisotope which emits radiation at the first energy level; and

a means **(50)** which receives radiation of the first energy level and emits radiation at the second energy level.

3. The system as set forth in claim 2, wherein the radioisotope in is a liquid solution.

4. The system as set forth in claim 3, wherein the means **(50)**, which emits radiation at the second energy level, includes:

a dense metal sheet **(52)** disposed along a rear side **(46)** of the tank **(42)** opposite the solid state detector **(20)**, the dense metal sheet **(52)** emitting the second energy level radiation by secondary emission.

5. The system as set forth in claim 4, further including a second metal sheet **(56)** disposed along a front side **(44)** of the tank **(42)** between the radioisotope and the solid state detector **(20)**, the second metal sheet **(56)** receiving radiation of the first energy level and emitting radiation of another energy level.

6. The system as set forth in claim 5, wherein the dense and second metal sheets **(52, 56)** include lead and emit secondary radiation at 70keV.

7. The system as set forth in claim 1, wherein the radiation emitting means **(40)** includes a single dual peak isotope which emits radiation at both the first and the second energy levels concurrently.

8. The system as set forth in claim 7, further including:

a source of a secondary radiation **(50)**, which converts some of the radiation emitted by the dual peak isotope to a characteristic energy level.

9. The system as set forth in claim 1, wherein the radiation emitting means **(40)** includes a mixture of isotopes, each isotope emitting radiation at at least one energy level.

10. The system as set forth in claim 9, further including:

a source of a secondary radiation **(50)** which receives radiation from the isotope mixture and emits radiation at a characteristic energy level lower than the energy levels of at least some of the radiation emitted by the isotope mixture.

11. The system as set forth in claim 1, wherein the solid state detector **(20)** includes an array of detector elements and the generating means **(16)** generates a set of radiation data for each detector element.

12. A method of calibrating a solid state detector **(20)** in a nuclear imaging system **(10)** comprising:

concurrently emitting radiation at at least first and second preselected energy levels;

generating associated sets of radiation data from the emitted radiation received by the detector **(20)**;

determining centers of energy peaks and energy values for the generated data sets; and

calibrating at least one of gain, offset, performance and dead pixel correction based on the determined centers and peaks of the acquired data sets.

13. A calibration phantom for a pixilated solid state detector, the phantom comprising:

a radioisotope layer which emits radiation of a first characteristic energy; and

a metal layer disposed parallel to the radioisotope layer to receive the radiation of the first characteristic energy from the radioisotope layer and emit radiation of a second characteristic energy by a secondary emission.

14. The calibration phantom as set forth in claim 13, wherein the radioisotope layer includes a radioisotope in liquid solution.

15. The calibration phantom as set forth in claim 14, wherein the liquid solution includes a plurality of radioisotopes each having a characteristic energy.

16. The calibration phantom as set forth in claim 14, wherein the radioisotope includes a radioactive isotope of at least one of Technetium, Gallium, Americium, Cobalt, and Germanium.

17. The calibration phantom as set forth in claim 13, wherein the metal layer is one of Lead, Copper, Molybdenum, Tungsten, and Tin.

18. The calibration phantom as set forth in claim 13, wherein the radioisotope has a dual energy peak.

19. In combination, the phantom of claim 13 and a pixilated nuclear camera, and further including:

a pixel energy peak analyzer which finds energy peaks generated about the first and second characteristic energies for each pixel of the pixilated nuclear camera; and

a calibration processor which utilizes the energy peaks information to at least one of correct each pixel's gain and offset, regulate the nuclear camera's overall performance, and recover dead pixels areas.